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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/830,214	04/22/2004	Se-hoon Oh	5649-1275	9024

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EXAMINER

GARCIA, JOANNIE A

ART UNIT PAPER NUMBER

2823

DATE MAILED: 07/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/830,214

Applicant(s)

OH ET AL.

Examiner

Joannie A. García

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 April 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 18 is/are allowed.
- 6) ☒ Claim(s) 1, 2, 5-14, 17, 19 and 20 is/are rejected.
- 7) ☒ Claim(s) 3, 4, 15 and 16 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

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The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1, 2, 7-10, 13, 14, 17, 19, and 20, are rejected under 35 U.S.C. 102(a) as being anticipated by Iizuka et al (US 2002/0190294 A1).

The rejection is maintained as stated in the Office Action mailed 04-26-05, and as stated below.

Applicant argues that Iizuka et al does not teach crystallizing an HfO_2 dielectric layer on a lower electrode of a capacitor structure in a low temperature plasma treatment at a temperature in a range between about 250 °C and about 450 °C, and that Iizuka et al does not even mention crystallization or a plasma. However, Iizuka et al discloses an ALD deposited HfO_2 dielectric layer 106 on a lower electrode 105 in a low temperature plasma atmosphere at a temperature in a range between about 250 °C and about 400 °C (Figure 13, and Paragraphs 0131, and 0134). Iizuka et al discloses that the dielectric layer 106 can be made of another materials, such as ZrO_2 , among others, besides HfO_2 (Paragraph 0134). Furthermore, Iizuka et al discloses that crystallization of an ALD deposited ZrO_2 dielectric layer is achieved by annealing or heating at a temperature in a range between about 250 °C and about 450 °C (Paragraphs 0076 and 0077), and therefore, formation of a crystallized ALD deposited HfO_2 dielectric layer 106 on a lower electrode 105 of a capacitor structure in a low temperature plasma treatment at a temperature in a range between about 250 °C and about 450 °C would have been achieved in the process of Iizuka et al.

Claims 5, 6, 11, and 12, are rejected under 35 U.S.C. 103(a) as being unpatentable over Iizuka et al as applied to claims 1, 2, 7-10, 13, 14, 17, 19, and 20, above, and further in view of Harada (US 2002/0195643 A1).

The rejection is maintained as stated in the Office Action mailed 04-26-05, and as stated below.

Applicant argues that Harada does not even mention a plasma treatment. However, Harada discloses annealing an HfO₂ dielectric layer in a plasma atmosphere including N₂ (Paragraph 0081). Furthermore, Harada discloses that performing a gas-containing step can be achieved in either a thermal process or a plasma process (Paragraphs 0140 and 0141). Therefore, a plasma treatment would have been mentioned and achieved in the process of Harada.

Applicant argues that Harada does not teach a HfO₂ dielectric layer, and that disclosure of a silicon-containing HfO₂ dielectrics, is not equivalent to HfO₂. However, the claims are not so limited. Furthermore, Harada discloses a dielectric layer made of HfO₂ (Paragraph 0081, lines 3-4), and annealing the HfO₂ dielectric layer in a plasma atmosphere including N₂ (Paragraph 0081, lines 4-7).

Claims 3, 4, 15, and 16, are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 18 is allowed.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joannie García whose telephone number is (571) 272-1861. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri, can be reached on (571) 272-1855. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



George Fourson
Primary Examiner
Art Unit 2823



JAG

July 9, 2005

GFourson
Primary Examiner